

Unsupervised Learning, Recommenders, Reinforcement Learning

by DeepLearning.AI & Stanford University

About this Course

In the third course of the Machine Learning Specialization, you will:

- Use unsupervised learning techniques for unsupervised learning: including clustering and anomaly detection.
- Build recommender systems with a collaborative filtering approach and a content-based deep learning method.
- Build a deep reinforcement learning model.

The Machine Learning Specialization is a foundational online program created in collaboration between DeepLearning.AI and Stanford Online. In this beginner-friendly program, you will learn the fundamentals of machine learning and how to use these techniques to build real-world AI applications.


This Specialization is taught by Andrew Ng, an AI visionary who has led critical research at Stanford University and groundbreaking work at Google Brain, Baidu, and Landing.AI to advance the AI field.

This 3-course Specialization is an updated and expanded version of Andrew's pioneering Machine Learning course, rated 4.9 out of 5 and taken by over 4.8 million learners since it launched in 2012.

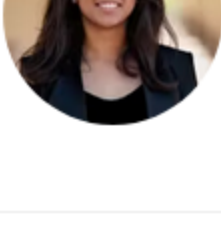
It provides a broad introduction to modern machine learning, including supervised learning (multiple linear regression, logistic regression, neural networks, and decision trees), unsupervised learning (clustering, dimensionality reduction, recommender systems), and some of the best practices used in Silicon Valley for artificial intelligence and machine learning innovation (evaluating and tuning models, taking a data-centric approach to improving performance, and more.)

By the end of this Specialization, you will have mastered key concepts and gained the practical know-how to quickly and powerfully apply machine learning to challenging real-world problems. If you're looking to break into AI or build a career in machine learning, the new Machine Learning Specialization is the best place to start.


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Taught by: **Andrew Ng**, Instructor
Founder, DeepLearning.AI & Co-founder, Coursera



Taught by: **Aarti Bagul**, Curriculum Engineer



Taught by: **Geoff Ladwig**, Curriculum Engineer
DeepLearning.AI


 Basic Info	Course 3 of 3 in the Machine Learning Specialization
 Level	Beginner
 Commitment	At the rate of 5 hours a week, it typically takes 3 weeks to complete this course.
 Language	English, Subtitles: Arabic, French, Bengali, Ukrainian, Chinese (Simplified), Greek, Italian, Portuguese (Brazil), Dutch, Korean, German, Pashto, Urdu, Russian, Thai, Indonesian, Swedish, Turkish, Azerbaijani, Spanish, Dari, Hindi, Japanese, Kazakh, Hungarian, Polish
 How To Pass	Pass all graded assignments to complete the course.
 User Ratings	★★★★☆ Average User Rating 4.9

Syllabus

Week 1


Unsupervised learning


This week, you will learn two key unsupervised learning algorithms: clustering and anomaly detection


 13 videos, 1 reading


1. **Video:** [Welcome!](#)
2. **Reading:** [IMPORTANT] Have questions, issues or ideas? Join our Forum!
3. **Video:** What is clustering?
4. **Video:** K-means intuition
5. **Video:** K-means algorithm
6. **Video:** Optimization objective
7. **Video:** Initializing K-means
8. **Video:** Choosing the number of clusters
9. **Video:** Finding unusual events
10. **Video:** Gaussian (normal) distribution
11. **Video:** Anomaly detection algorithm
12. **Video:** Developing and evaluating an anomaly detection system
13. **Video:** Anomaly detection vs. supervised learning
14. **Video:** Choosing what features to use

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 **Graded:** Clustering


 **Graded:** k-means

 **Graded:** Anomaly detection

 **Graded:** Anomaly Detection


Week 2


Recommender systems


 15 videos


1. **Video:** [Making recommendations](#)
2. **Video:** Using per-item features
3. **Video:** Collaborative filtering algorithm
4. **Video:** Binary labels: favs, likes and clicks
5. **Video:** Mean normalization
6. **Video:** TensorFlow implementation of collaborative filtering
7. **Video:** Finding related items
8. **Video:** Collaborative filtering vs Content-based filtering
9. **Video:** Deep learning for content-based filtering
10. **Video:** Recommending from a large catalogue
11. **Video:** Ethical use of recommender systems
12. **Video:** TensorFlow implementation of content-based filtering
13. **Video:** Reducing the number of features (optional)
14. **Video:** PCA algorithm (optional)
15. **Video:** PCA in code (optional)
16. **Ungraded Lab:** PCA and data visualization (optional)


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 **Graded:** Collaborative Filtering

 **Graded:** Collaborative Filtering Recommender Systems

 **Graded:** Recommender systems implementation


 **Graded:** Content-based filtering

 **Graded:** Deep Learning for Content-Based Filtering

Week 3


Reinforcement learning


This week, you will learn about reinforcement learning, and build a deep Q-learning neural network in order to land a virtual lunar lander on Mars!


 18 videos, 3 readings


1. **Video:** [What is Reinforcement Learning?](#)
2. **Video:** Mars rover example
3. **Video:** The Return in reinforcement learning
4. **Video:** Making decisions: Policies in reinforcement learning
5. **Video:** Review of key concepts
6. **Video:** State-action value function definition
7. **Video:** State-action value function example
8. **Ungraded Lab:** State-action value function (optional lab)
9. **Video:** Bellman Equation
10. **Video:** Random (stochastic) environment (Optional)
11. **Video:** Example of continuous state space applications
12. **Video:** Lunar lander
13. **Video:** Learning the state-value function
14. **Video:** Algorithm refinement: Improved neural network architecture
15. **Video:** Algorithm refinement: ϵ -greedy policy
16. **Video:** Algorithm refinement: Mini-batch and soft updates (optional)
17. **Video:** The state of reinforcement learning
18. **Reading:** [IMPORTANT] Reminder about end of access to Lab Notebooks
19. **Video:** Summary and thank you
20. **Video:** Andrew Ng and Chelsea Finn on AI and Robotics
21. **Reading:** Acknowledgments
22. **Reading:** (Optional) Opportunity to Mentor Other Learners

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 **Graded:** Reinforcement learning introduction

 **Graded:** State-action value function

 **Graded:** Continuous state spaces

 **Graded:** Reinforcement Learning

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How It Works

General

How do I pass?

To earn your Certificate, you'll need to earn a passing

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Programming assignments


Programming assignments require you to write and run a computer program to solve a problem.

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Course 3 of Specialization

#BreakIntoAI with Machine Learning Specialization

Master fundamental AI concepts and develop practical machine learning skills in the beginner-friendly, 3-course program by AI visionary Andrew Ng




Machine Learning
DeepLearning.AI, Stanford University

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